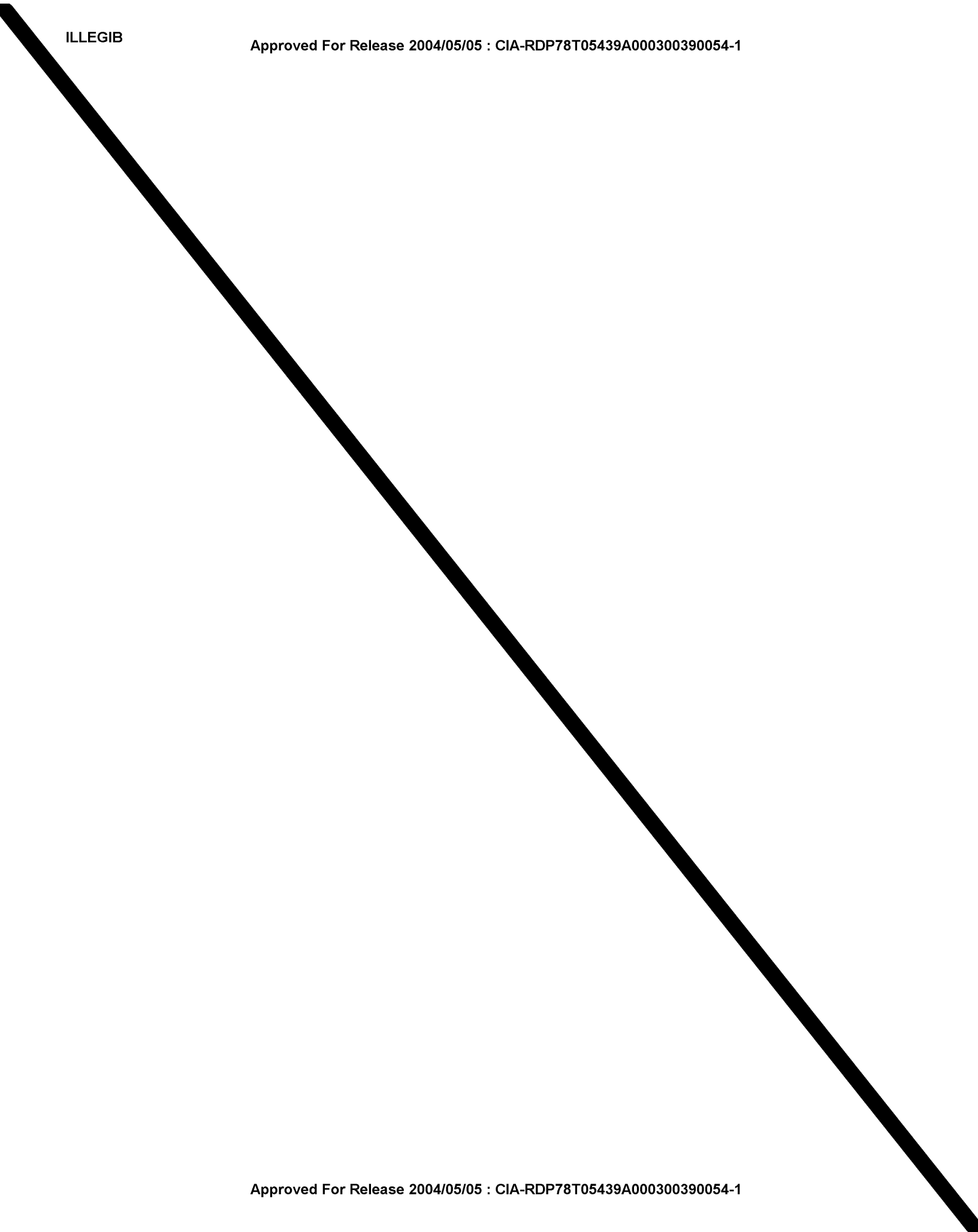

Approved For Release 2004/05/05 : CIA-RDP78T05439A000300390054-1

TOP SECRET [redacted]

[redacted]
M/EB 324/64
18 June 1964
Copy 1

MEMORANDUM FOR: Chief, Military-Economics Division, ORR

ATTENTION: [redacted]

THROUGH: Chief, Requirements Branch, Reconnaissance Group, CGS

FROM: Chief, CIA/PID (NPIC)

SUBJECT: Leningrad Probable AMM Chronology

REFERENCE: (a) Requirement C-RR-4-81,438
(b) CIA/PID Project C 935-64

1. This memorandum is in response to your requirement dated 22 May 1964 which requested: (1) a list of every change that has been observed at the Northwest, Southwest and Northeast Complexes since [redacted] which can be attributed to new or additional construction activity rather than improved photo quality; (2) brief description of changes; (3) dates and mission numbers of original observation of the features and the dates and mission numbers of the observation of the changes; and (4) line drawings of complexes, if appropriate, to show locations of the listed activity.

2. This report covers primarily the Northwest and the Northeast complexes (D34 and B05) in view of the fact that an NPIC/PAG detailed report on the Southwest Complex (D25) is currently in the process of being published. Reference your requirements C-DI-4-81,376 and C-RR-4-81,456 and National project numbers N 546-64 and N 642-64.

All three probable antimissile complexes in the Leningrad area have now been covered by relatively large scale, good to excellent quality KH-7 [redacted] photography. Though two of the complexes were covered in stereo, comparative KH-7 coverage exists on only one complex and it was covered twice with no stereo. The following KH-7 photography was examined:

Complex	[redacted]
Northwest (D34)	
Northeast (B05)	
Southwest (D25)	

Reviewed by NGA.

S-132221

TOP SECRET [redacted]

SUBJECT: Leningrad Probable AMM Chronology [redacted]

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3. An analysis of this relatively large scale KH-7 photography, especially [redacted] has made it possible to detect numerous relatively small but important features. When compared with previous KH-4 photography the significance of many previously detected details can also be deduced. Though this results in a greater degree of confidence regarding re-interpretations, the photo analyst is still limited by the following critical factors:

a. Most of the construction on the Leningrad complexes was accomplished prior to the advent of the KH-7 system, during the early months of KH-4 operations. During this period, photographic quality was very poor to fair due to system limitations, frequently degraded by unfavorable atmospheric conditions over the Leningrad area. It is believed the intelligence analyst must have some understanding of relationship between the phrase "poor quality photography" and interpretability. In this regard, attention is invited to Attachment 1.

b. Comparative coverage, perhaps the most important tool in photo analysis, is available with high quality KH-7 photography on only one complex, (D25), and the time span involved is only 26 days. Furthermore, this comparative cover is non-stereo.

4. Following a thorough analysis of the KH-7 photography, available KH-4 coverage was re-examined with the view of detecting changes which would permit the determination of a time span within which specific construction was terminated. Comparative examination of KH-4 and KH-7 photography covering installations under construction has revealed the difficulty of detecting evidence of continued construction activity on less than excellent KH-4 photography. For example, after superstructures have been erected and roofed, continued work on the buildings may go undetected. The limitations imposed by relatively poor Ground Resolution must be considered when the photo analyst reports that a certain change appears to have taken place, or that a structure appears to be complete. In some cases, however, the analysis may be substantiated to some degree by a convergence of photographic and other evidence.

5. To facilitate reporting changes and activity revealed on larger scale photography it is necessary to assign descriptive terms to the various critical facilities and features visible. Attachments 2 and 3 are line drawings with terminology used in this report. This terminology was coordinated with the PAG/NPIC photo analyst assigned to the Leningrad complexes. Attachments 4 and 5 contain textual chronologies of construction progress at Leningrad Probable AMM Complexes, B05 and D34.

SUBJECT: Leningrad Probable AMM Chronology

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6. Conclusions Regarding Termination of Construction

a. The Northeast Complex (B05)

(1) Support Areas: Termination of construction activity possibly occurred sometime between [redacted] though most of the construction in the support area was probably completed prior to [redacted]

(2) Electronics Area: Though it is suspected that some activity at the north outrigger took place as late as the period [redacted] it is believed that the last significant construction activity occurred during the period [redacted]

(3) Launch Sites: Termination of activity at the launch sites possibly took place during the period [redacted] however high quality, relatively large scale photography under no snow conditions would be required to determine if any additional work was accomplished after [redacted]

b. The Northwest Complex (D34)

(1) Support Areas: Most of the construction activity in the support areas took place sometime prior to [redacted] A few small structures were possibly added between [redacted] Construction of a co-located SA-3 SAM site was begun between [redacted] Two small temporary type buildings in the construction support area were demolished sometime between [redacted]

(2) Electronics Area: Significant construction activity in the electronics area probably ceased sometime between [redacted] though additional roof surfacing on the control building could have occurred between [redacted] A section of the circular, elevated probable ground clutter screen was removed sometime during the period [redacted] though it possibly may have been removed during the period [redacted] The circular screen type structure appeared intact on [redacted] Had the section never been installed, or had it been removed prior to [redacted] it is believed the large gap in the circular screen would have been revealed by [redacted] It is nevertheless believed that this removal should not at this time be called "dismantlement." If the Soviets were in fact dismantling the screen it seems they would have progressed with the job more vigorously than the evidence suggests.

SUBJECT: Leningrad Probable AMM Chronology [redacted]
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It is more likely that the section was removed due to some defect and never replaced due to probable termination of construction activity. Resumption of activity at the control building suggests that construction activity at the electronics area probably resumed during the period [redacted] though it does not yet appear to be a vigorous or major resumption of activity.

(3) Launch Sites: The major construction effort on the launch sites probably took place during the period [redacted] However, there is evidence of some, possibly minor, construction activity throughout the summer of 1963. Activity in the vicinity of a number of missile ready buildings on [redacted] indicates that work on the weapon system continues.

c. The Southwest Complex (D25)

Construction progress at this complex closely parallels that observed at the other two complexes. There is no apparent evidence of a resumption of construction activity, with the current status probably similar to that revealed by [redacted] A detailed comparative analysis of the two relatively large scale KH-7 missions over this complex reveals no apparent sign of any resumption of construction nor any definite sign of significant activity over the 26 day time span. However it is conjectured that the presence of SA-3 missiles and organic transport in a temporary vehicle park rather than in their normal launch site nearby may be significant. It could mean that the Soviets plan to construct earthen ramps (similar to Site D34) in the area now occupied by the SA-3 site and that work will commence very shortly.

7. The photo analyst on this project is [redacted] who may be contacted on extension [redacted] should you have any further questions concerning this project.

8. This project is considered to be complete.

[redacted]

Enclosures:
1 - Three textual chronologies
(two in table form)
2 - Two line drawings
(CIA/PID/MEB-P-509/64 and P-510/64)

[redacted]

Attachment 1 to:
[redacted]
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Ground Resolution and Interpretability at Leningrad

To keep from getting "too technical," the photo analyst is generally asked to use the phrase poor quality photography when he wishes to inform the reader that his analysis of a given mission was limited by poor ground resolution. It is believed that the user of photo intelligence should have some understanding of the variables which effect the photo analyst's ability to produce information from aerial or satellite reconnaissance photography.

Ground Resolution (GR) or ground detection size, is simply the ground size equivalent to one line at the limit of resolution. Though the resolution capability of a given film lens combination may be high, the actual resolution produced by the system may be much less than this optimum because of numerous degrading variables. Most important of these degrading factors are weather, image motion, light conditions and possibly less than optimum film processing. Furthermore, target conditions of tone and contrast with the tone of contiguous areas can frustrate identification and even detection, though theoretically the resolution is adequate. This may be further agravated, probably to no small degree, by the necessity to use relatively poor quality optics in photo analysis. Thus if a given film-lens combination, plus all the above possible degradations, ultimately yield X lines per millimeter to the photo analyst, the Ground Resolution (GR) will be equal to the Photo Scale Reciprocal (PSR) divided by the resulting Interpretable Film Resolution (IFR).

$$GR = \frac{PSR}{IFR}$$

5X1

[redacted]

[redacted]

[redacted]

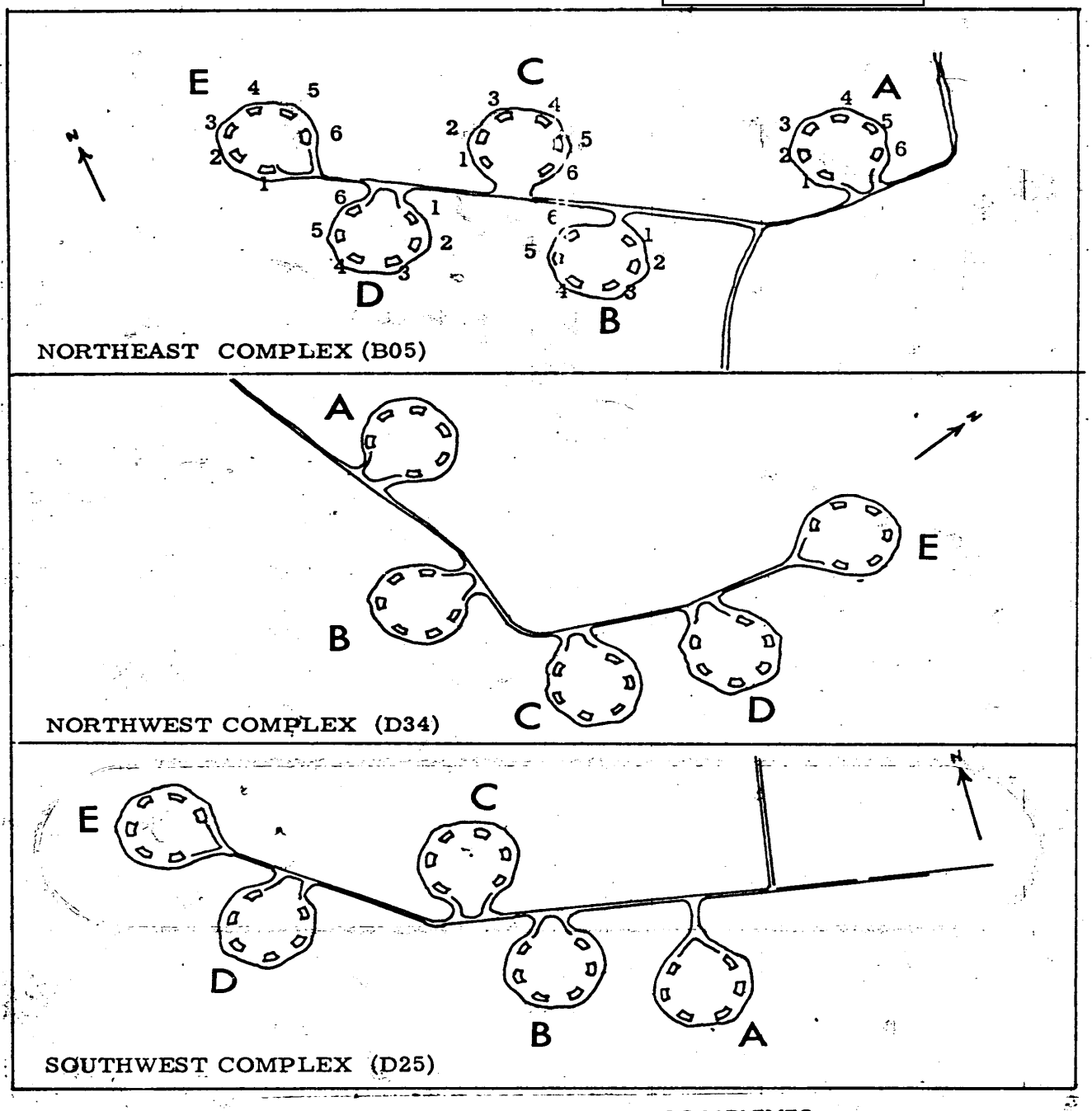
Attachment 1

An extremely important factor in identification, and even detection of a given feature, is stereoscopic viewing of overlapping or convergent photography. With sufficient photo quality and large scale, the resulting Interpretable Film Resolution may be such that familiar objects in their normal environment can be detected and identified easily without stereo. However, where interpretable film resolution results in objects at the threshold of detection or identification, or where the object photographed is of unknown configuration (which is usually the case in new weapons systems), stereoscopic viewing adds an important and critical element in photo analysis. Unfortunately, many of the KH-4 missions which produced stereo with twin convergent photography failed to get equally good quality imagery with both cameras. This has sharply reduced the usefulness of stereo in such cases.

A given photo mission may produce much better resolution over one area than over another. This is generally due to available light (time of day) and weather conditions over the target area. Perhaps some of the best KH-4 Interpretable Film Resolution was produced over Sary Shagan, USSR by [redacted] None of the KH-4 missions over Leningrad prior to [redacted] produced photography of this quality. Such quality would possibly permit detection of large vehicles, when conditions of tone contrast were optimum, such as a truck on an open concrete highway with no tree shadows falling on the road surface. A KH-7 mission such as [redacted] over Leningrad, however, permits detection of vehicles even when they are off the highway, and sometimes allows identification as to type, especially when accurate scale factors have been computed.

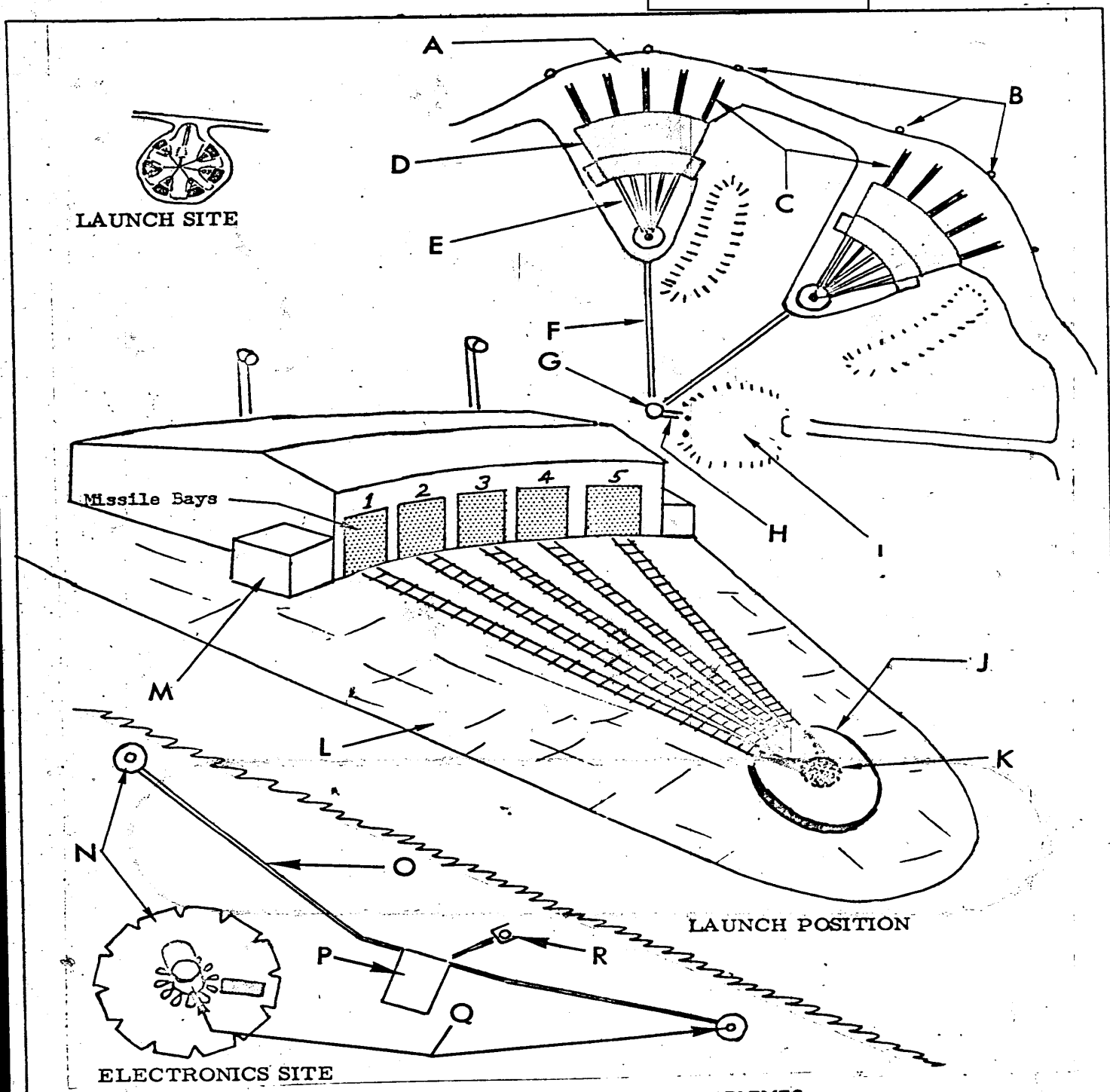
Consequently, it must be concluded that construction progress needs to be sufficiently gross and involve adequate tone contrast to be detected on degraded KH-4 photography such as that which covered the Leningrad probable AAM complexes prior to the summer of 1963.

[redacted]



LENINGRAD PROBABLE AMM COMPLEXES

LAUNCH SITE AND LAUNCH POSITION DESIGNATION TECHNIQUE



LENINGRAD PROBABLE A/MM COMPLEXES

A Perimeter Service Road
B Light-poles (probable)
C Loading Rails
D Missile Ready Building
E Launch Point Access Rails
F Launch Position Control Conduit
G Conduit Junction Cylinder
H Central Control Conduit
I Launch Site Control Building (Bunkered)
J Launch Pad
K Launch Point
L Launch Position Shoulders
M Ready Building Engine House (suspect)
N Ground Clutter Screen (probable)
O Electronics Site Cable Conduit
P Control Building (Complex Control Center)
Q Radar Tower (Suspect environmental cylinder)
R Radar Position

ATTACH. NO. 3

25X1

Attachment 4 to:

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25X1

THE NORTHEAST COMPLEX (B05)

	Support Areas	Electronics Area	Launch Sites
	The support areas, including the larger structures can be detected.	The site of the control building can be detected, indicating possible construction activity.	Launch Site A: Ready Buildings suspected under construction. Launch Site B: Construction on four or five curved ready buildings possibly underway. Other Launch Sites: Construction is possibly in less advanced stages.
	Support areas are visible, including most of the buildings.	The complex control building and smaller associated structures can be detected, however the stage of construction cannot be determined. It is suspected that construction work is still in progress.	Erection of all curved ready buildings at Launch Sites A and B, including some roof surfacing, probably completed. At Launch Site C construction of ready buildings is in less advanced stages. with roof surfacing on all structures probably not complete. Curved ready buildings at Launch Sites D and E are at less advanced stages with possibly the footings in place or superstructure in the process of erection. Ready building number 6 at Launch Site D is possibly the most advanced at Site D.
	No significant changes in any of the areas can be detected.		
	No significant changes in any of the areas can be detected.		

25X1

25X1

Date & Mission	Photo Quality	Support Areas	Electronics Area	Launch Sites
		More clearly seen, however, no significant changes can be seen. A borrow pit adjacent to the road linking the support area and the complex control center is very prominent.	The complex control building is cloud covered, however, possible cable conduits leading to the outrigger positions from the control building can be detected.	Erection of all curved ready buildings at Sites A, B, and C, including roof surfacing, has been completed. At site D, all curved ready buildings have been erected, however, roof surfacing has not commenced. At Site E, ready buildings 1 through 5 appear to have reached the same stage of construction as those at Site D, however the superstructure of ready building 6 is probably still being erected. All launch site control buildings can be detected.
		No significant changes in any of the areas can be detected.		
		No significant changes in any of the areas can be detected.		
		No significant changes in any of the areas can be detected.		
		A wing has possibly been added to the large shop type building in the main support area.	Recent activity on and near the electronic control building is evident after snow fall. Possibly the building is partially covered with dirt. Track activity and a possible conduit to both outrigger radar positions is evident, with the track to the southern outrigger more prominent. Evidence of earth grading and possible footing installation can	No apparent change.

25X1

25X1

Support Areas	Electronics Area	Launch Sites
	be seen at both radar positions. Though this earth disturbance is possibly snow covered, the activity which caused it probably occurred since the last photo coverage [redacted] There is evidence of probable construction material in the vicinity of both cotriggers, especially the north position.	25X1 25X1
No significant changes seen.	No significant changes seen.	Some of the launch position shoulders appear to be concrete surfaced. Dark strips on the site service roads to the rear of the ready buildings can be seen. It is believed the above items would probably have been installed following completion of the ready buildings, therefore this construction probably took place [redacted] time between
No significant changes in any of the areas can be seen.		
No significant changes seen.	No significant changes seen.	Probably concrete surfaced launch position shoulders can be detected at more launch sites indicating continued construction activity. Probably circular launch pads can be seen at Launch Sites D and E.
No significant changes in any of the areas can be detected.		

25X1

25X1

	Support Areas	Electronics Area	Launch Sites
	No significant change seen.	The prepared area at the north outrigger radar position appears less prominent than it did on the most recent coverage of nearly similar quality [redacted]. At the same time, the appearance of the south outrigger position has changed very little if at all. As tonal contrasts throughout the area appear similar on both missions, this change in appearance of the north outrigger position indicates the probability of some activity, though it cannot be identified.	The dark strips to the rear of the ready buildings are more prominent, however, this could be the result of better photo quality. 25X1
	No significant change can be detected which is not attributable to the increased photo scale and quality.	Same comment as for support area. The outrigger positions are snow covered and there is no sign of activity. Footings for possible steel supports are visible at each outrigger position. The base for a cylindrical radar tower can be seen at the southern outrigger. However, such small details can be reported only because of the decreased "ground detection size."	Same comment as for support area. There is no activity visible in the area. The launch sites are not complete. Various essential elements are at different stages of completion. As an example, the control building at Launch Site A and possibly Launch Site B are the only ones which show evidence of bunkering, which in any case is not complete. An uncompleted launch site conduit junction cylinder at Launch Site B is noted, however, they are not visible at any of the other sites. Though these features can be detected due to the improved interpretability, they are mentioned here to show that construction activity was halted prior to completion.

25X1

25X1

Attachment 5 to:
[redacted]
M/EB-324/64

25X1

THE NORTHWEST COMPLEX (D34)

	Support Areas	Electronics Area	Launch Sites
[redacted]	No evidence of this complex.		
	Only one of the small construction support areas is visible through the clouds.	Cloud covered.	Only Launch Sites C and D are visible through the clouds. It is possible that erection of missile ready buildings has not yet begun or is in early stages. Pear shaped outlines of launch positions and the site perimeter service roads can be detected.
	The support area, including the larger structures can be detected.	The site of the control building and possibly a portion of the road leading to the northern outrigger can be detected, indicating possible early stages of construction.	Construction of curved ready buildings is underway, being most advanced at Sites A and B where the superstructure and roof have possibly been constructed. There is also some evidence of a lesser amount of such progress at Launch Site D and possibly E and C.
	Probably complete.	The control building is probably under construction. A cable scar or conduit to the north outrigger and a portion of a cable scar or conduit to the south outrigger can be seen. There is evidence of activity at the terminous of the north outrigger.	Missile ready buildings can be seen at Launch Sites A, B, C, E and probably at D.

25X1

Support Areas	Electronics Area	Launch Sites
No significant change can be detected.	The control building is still under construction and activity can now be detected at the terminous of each outrigger.	It is suspected that concrete surfacing has been applied to the perimeter service road at Launch Sites A and B. This phase in the construction cycle may not have been reached at the other three launch sites. Missile ready buildings can be seen at all the sites.
No significant changes can be detected at any of the facilities.		
No significant change can be detected.	The pre-cast concrete slabs which probably form the control building roof are probably being applied, with approximately 50 percent of the roof so covered. Earth scars and possibly conduits connect the control building with the outriggers. A road cuts across the earth scar connecting the control building with the southern outrigger. This road connects a borrow pit on the west side of the control building with the main service road to the east. This indicates that if a conduit is being constructed, a section has been left out to permit dump trucks through to the road serving the launch sites. The probably concrete, cylindrical radar towers are probably under construction. Some of the elevated circular probable ground clutter screens may be under construction, however, the photo quality precludes confirmation.	Launch site (probable concrete) service roads can be seen at all sites. Probably concrete launch position shoulders have been laid at most of the launch positions at launch sites C and D, and a portion of the positions at the other sites in the complex. It is possible that roof surfacing has not been laid on ready buildings 5 and 6 at Launch Site E. Launch Site control buildings can be detected at Sites A, B, D and possible E.

Support Areas	Electronics Area	Launch Sites
No significant change can be detected.	The control building roof is probably completely covered with pre-cast concrete slabs and a probable water proofing compound is being applied. Work at the outrigger radar positions has continued since the last mission.	No significant change can be detected.
No significant change can be detected.	The circular probable ground clutter screen or a portion of it, has been erected at the southern outrigger.	No significant change can be detected.
A few small structures have possibly been added to the east side of the south barracks area. An access road to the colocated SA-3 SAM site (D3h-3) has been constructed since the last mission. The road is clear of snow indicating that work on the site is in progress. Gravel is being secured from an area adjacent to the south side of the semi-buried control building. Snow clearance and activity is evident in all support areas and access roads except as reported for the electronics and launch site areas.	The control building roof has probably been completely covered with pre-cast concrete slabs and a small portion of it (north and south edge) has been covered with dirt. A cleared area and a small circular object appears approximately 300 feet north of the control building. Elevated circular probable ground clutter screens appear to be complete and are possibly clear of snow. However, the access roads to both outriggers are snow covered, indicating they may have been only lightly used since the snow fall, if at all. The cylindrical radar towers protrude through the center of the probable ground clutter screens.	All ready buildings at each launch site are in place. All launch site areas, service roads, access roads and ready buildings are covered with snow, indicating the area is secured and inactive. Most launch position revetments are in place, however, quality of previous missions does not permit placing their construction into a reasonable time span.

Support Areas	Electronics Area	Launch Sites
Mostly cloud covered. No significant change can be detected. SAM Site D34-3 is cloud covered.	Cloud covered.	Clouds cover parts of Launch Sites A, D and E. Additional concrete launch position shoulders can be detected. Probable rail beds for missile loading rails can be detected to the rear of some of the missile ready buildings. The latter features would not have been detected on [redacted] due to poor ground resolution. Snow cover on Mission [redacted] would have prevented their detection. The added work on launch point shoulders could have occured between [redacted]
Work on the colocated SAM Site D34-3 has progressed since [redacted] Central control and launch revetments at the SA-3 site can be detected. No other significant changes can be detected.	A strip down the center of the control building roof has been covered with a black, probable water proofing compound. No other significant changes can be detected. This strip could have been added during the period [redacted]	The shoulders at Positions A1, A2, A5, B6, D6 and E1 through E4 appear darker and may not have a concrete surface. All other shoulders are possibly concrete surfaced.
No significant changes can be detected. However, progress in construction of SAM Site D34-3 is seen. Concrete access roads to the central control revetment and launch position revetments can be seen. Gravel for this construction is probably being hauled from the area adjacent to the south side of the control building and from a borrow pit west of the control building. The road from the borrow pit cuts across the line from control building to southern outrigger. This has been evident since [redacted] indicating that a section of the	A section out of the western side of the northern probable ground clutter screen (as seen on Mission [redacted]) is possibly missing.	Concrete launch position shoulders are possibly present at all launch positions with the possible exception of A1, A5, and A6, which appear black topped. (A6 shoulders did not appear dark on the previous mission.) A revetment was possibly added to Position D5 since [redacted] The area between missile ready building loading rails to the rear of ready building A1 has been covered with a black surfacing material. The latter is probably new.

Support Areas	Electronics Area	Launch Sites
electronics site cable conduit has not been installed.		
No changes can be detected.	It is suspected that a section of the northern elevated, circular probable ground clutter screen is still missing.	No changes can be detected in the sites which are not cloud covered.
No significant changes can be detected.	The missing section out of the northern probable ground clutter screen is confirmed. No other significant changes are noted.	The black top on launch position shoulders at Launch Positions A1, A5 and A6 is confirmed. The space between ready building loading rails at A6 has now been surfaced with similar dark material. The area behind ready building A5 is not yet black topped. Probable rail beds can be detected behind all ready buildings except A1 and A6. The black top which covers the surface behind the buildings probably prevents detection.

Many previously unseen details of construction can be seen due to the excellent photo quality, stereo coverage and relatively large photo scale, however, only that evidence which reveals construction progress or activity since previous missions is recorded here.

Two temporary type buildings in the construction support area southeast of the barracks area have been demolished. A vehicle count in the entire complex reveals the following: 45 dump trucks, 13 cargo trucks, 18 unidentified vehicles, 12 possible vehicles, 2 suspect vehicles, 1 dozer, 1 power shovel. 1 possible vehicle is a suspect automotive crane.	The control center roof continues to receive a coating of black waterproofing material. Approximately 50 percent of the roof has now been surfaced, however, no attempt has been made to clear the small amount of dirt which had previously been pushed onto the roof. A new dirt road can be seen branching from the break in the cable conduit south of the control center. This dirt road	It is possible that inner doors on most missile ready buildings are open. Stationary and moving vehicles can be seen at all launch sites. A detailed report on all vehicular activity will be forthcoming in answer to Requirement C-RR-4-81,462. Black top surfacing is now visible between rail beds to the rear of ready building A6, in addition to locations previously reported.

Support Areas

The colocated SA-3 site is occupied.

Electronics Area

curves around to the west end of the control building.

Eight to ten [redacted] possible crates or stacks of construction material and one possible truck can be seen adjacent to the south outrigger position. The excellence of this photography permits determination that two rectangular perimeter "petals" plus a few inner sections on each side of a rectangular opening in the north probable ground clutter screen have been removed; (previously reported, however KH-4 ground resolution precludes determination regarding how much of the section was removed during each time period.) The [redacted] of the missing section measures approximately 85 feet. There are 5 to 10 crates or stacks of material in the vicinity of the north outrigger. Five suspected electronics associated earthen ramps are being constructed in a secured area approximately 2,500 feet SSE of Launch Site C. The ramps are 75 to 90 feet wide at the terminal end and 30 to 50 feet wide at the access end. Dump trucks are active, bringing dirt from the vicinity of the control center and a borrow pit southeast of the construction support area. A bulldozer can be seen spreading the dirt on one of the ramps. Lines connecting the five ramps form a pentagon 700 to 800 feet on a side. A 60 by 45 foot area of disturbed earth (suspected preparation for construction) is located in the approximate center of the pentagon, adjacent to one of the service roads. A 20 by 30 foot probable construction shed and stacked material are nearby.

Launch Sites

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